

REMARKS

Claims 1-11 are pending in the application and were examined and reported in the Office Action. Claims 1-4 are rejected. Claim 1 is amended. The amendments to claim 1 are described in the specification and illustrated in Figure 6. No new matter has been added. Claims 1-11 remain.

Applicant requests reconsideration of the application in view of the following remarks.

I. 35 U.S.C. §103(a)

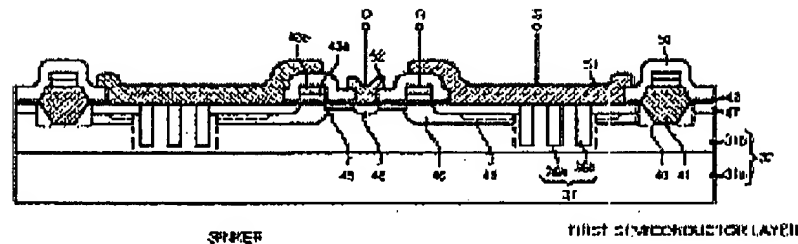
A. It is asserted in the Office Action that claims 1 and 4 are rejected under 37 U.S.C. §103(a) as being unpatentable over US Patent No. 6,242, 787 issued to Nakayama et al. ("Nakayama") in view of Applicant's admitted prior art ("AAPA"). Applicant respectfully disagrees.

Applicant's amended claim 1 contains the limitations of "[a]n HF power device in an HF transistor, comprising: ... a sinker as the first conductive type provided as a column shape of a plurality of trench structures for dividing into two source areas and directly connecting the source area and the first semiconductor layer by piercing through the source area and the second semiconductor layer ..."

In other words, a sinker is formed on a source area by piercing through the source area and the second semiconductor layer. That is, the source area is directly connected to the first semiconductor layer by the sinker having a column shape of a plurality of trench structures as shown in following drawing.

BEST AVAILABLE COPY

THE PRESENT INVENTION
FIG. 6



According to MPEP §2142 "[t]o establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." (*In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)). Further, according to MPEP §2143.03, "[t]o establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. (*In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974))." "All words in a claim must be considered in judging the patentability of that claim against the prior art." (*In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970), emphasis added.)

Nakayama discloses a semiconductor device including a reduced surface field strength type MOS transistor (LDMOS) that prevents the breakdown of elements at channel formation portions when a reverse voltage is applied to its drain. Distinguishable from Applicant's claimed invention, in *Nakayama*, a sinker is formed

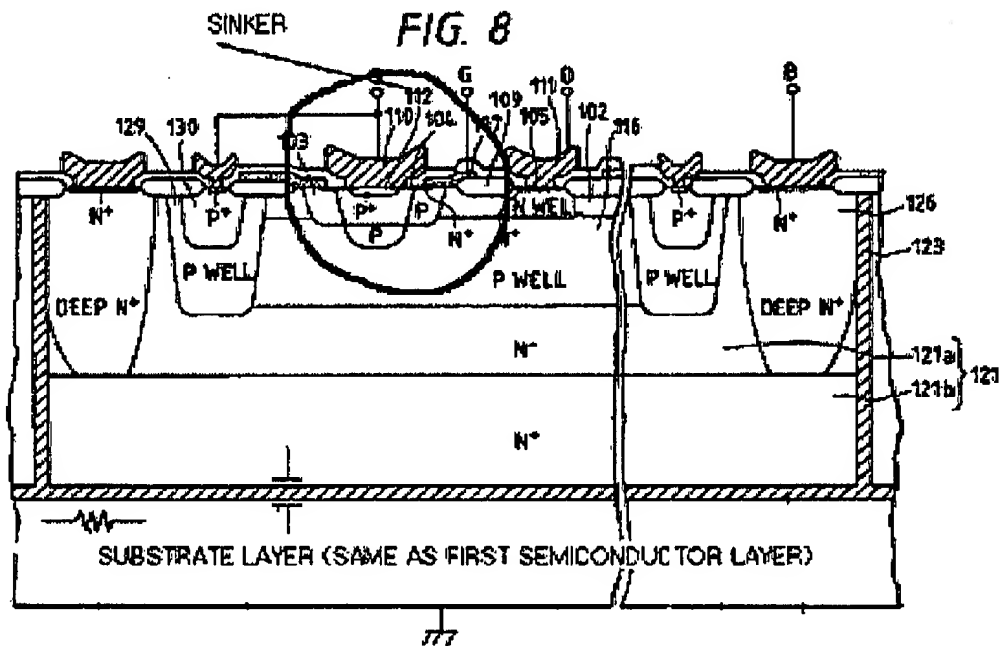
by P+ and P regions of a source area, and the source area is electrically connected through the PN diode to the substrate layer. In other words, the trench structure is not directly connected to the substrate layer as shown below in Figure 8 of Nakayama.

U.S. Patent

Jan. 5, 2001

Sheet 7 of 11

US 6,242,787 B1



Further, Nakayama does not teach, disclose or suggest "a sinker as the first conductive type provided as a column shape of a plurality of trench structures for dividing into two source areas and directly connecting the source area and the first semiconductor layer by piercing through the source area and the second semiconductor layer."

It is asserted in the Office Action that AAPA discloses an LDD area as a second conductive type formed on the surface of the semiconductor layer between the drain area and the gate electrode. AAPA, however, does not teach, disclose or suggest "a sinker as the first conductive type provided as a column shape of a plurality of trench structures for dividing into two source areas and directly connecting the source area

and the first semiconductor layer by piercing through the source area and the second semiconductor layer."

Since neither Nakayama, AAPA, or the combination of the two teach, disclose or suggest the limitations contained in Applicant's amended claim 1, as listed above, there would not be any motivation to arrive at Applicant's claimed invention. Thus, Applicant's amended claim 1 is not obvious over Nakayama in view of AAPA since a *prima facie* case of obviousness has not been met under MPEP §2142. Additionally, the claim that directly depends from amended claim 1, namely claim 4, would also not be obvious over Nakayama in view of AAPA for the same reason.

Accordingly, withdrawal of the 35 U.S.C. §103(a) rejection for claims 1 and 4 are respectfully requested.

B. It is asserted in the Office Action that claims 2 and 3 are rejected under 35 U.S.C. §103(a) as being unpatentable over Nakayama and AAPA as applied to claim 1, and further in view of U.S. Patent No. 6,326,656 issued to Tihanyi ("Tihanyi"). Applicant respectfully disagrees.

Applicant's claims 2 and 3 depend on amended claim 1. Applicant discussed Nakayama in view of AAPA regarding claim 1 above in section I(A).

Tihanyi discloses a lateral high-voltage transistor that has a semiconductor body made of a lightly doped semiconductor substrate of a first conductivity type and the epitaxial layer is made of a second conductivity type. Tihanyi also discloses the transistor includes trenches between the source electrode and the drain electrode. The walls of these trenches are highly doped with dopants of the first conductivity type.

Tihanyi, however, does not teach, disclose or suggest "a sinker as the first conductive type provided as a column shape of a plurality of trench structures for dividing into two source areas and directly connecting the source area and the first semiconductor layer by piercing through the source area and the second semiconductor layer."

Since neither Nakayama, AAPA, Tihanyi, or the combination of the three teach, disclose or suggest the limitations contained in Applicant's amended claim 1, as listed

above, there would not be any motivation to arrive at Applicant's claimed invention. Thus, Applicant's amended claim 1 is not obvious over Nakayama and AAPA in view of Tihanyi since a *prima facie* case of obviousness has not been met under MPEP §2142. Additionally, the claims that directly or indirectly depend from amended claim 1, namely claims 2-3, would also not be obvious over Nakayama and AAPA in further view of Tihanyi for the same reason.

Accordingly, withdrawal of the 35 U.S.C. §103(a) rejection for claims 2 and 3 are respectfully requested.

CONCLUSION

In view of the foregoing, it is believed that all claims now pending, namely 1-11, patentably define the subject invention over the prior art of record and are in condition for allowance and such action is earnestly solicited at the earliest possible date.

If necessary, the Commissioner is hereby authorized in this, concurrent and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2666 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17, particularly extension of time fees.

Respectfully submitted,
BLAKELY SOKOLOFF TAYLOR & ZAFMAN LLP

Dated: August 16, 2004

By _____
Steven Laut, Reg. No. 47,736

12400 Wilshire Boulevard
Seventh Floor
Los Angeles, California 90025
(310) 207-3800

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail with sufficient postage in an envelope addressed to:
Commissioner for Patents, P. O. Box 1450, Alexandria, Virginia 22313-1450 on August 16, 2004.

Jean Svoboda

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☒ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.